



10920 MADISON AVENUE • CLEVELAND, OHIO 44102
(216) 281-1100 • www.meriam.com • FAX: (216) 281-0228

MODEL 30PA10

SIGNIFICANCE & DESCRIPTION

Originally designed for calibration of aircraft instruments, the Meriam Model 30PA10 is ideally suited for calibration of conventional process instruments. The feature of a multiple scale provides the flexibility of many direct reading scales in one instrument.

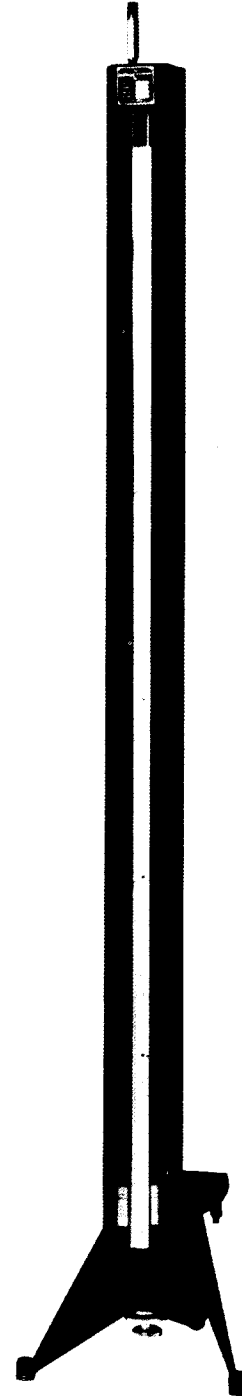
To maintain accurate calibration of instruments, the manometer is generally considered and accepted as the primary standard. All instruments operating on a pressure principle are calibrated at the factory with master standard instruments of the same type, or with manometers. The manometer is considered the basic standard because it has no moving parts except for the indicating fluid. In using the manometer, friction forces due to levers, diaphragms, gears, and cams are eliminated.

Of the U type and well type manometer designs, the well type manometer is generally selected because it is direct reading. In using the well type manometer it is not necessary to add the liquid deflections above and below normal zero as with the conventional U type manometer in measuring a given pressure, vacuum, or differential.

The range of a manometer to measure a given pressure or vacuum will depend upon the density of the indicating fluid used in the indicating tube of the instrument. For instrument test work water and mercury are universally used as the manometer indicating fluids. In some cases light gravity oils have been used as the indicating medium in the manometer rather than water; however, due to greater specific gravity variation of the oil with change in temperature, water has been considered the better and most reliable indicating fluid.

A well type manometer with a single inches and tenths scale could be used in checking the calibration of an aircraft instrument. By the use of conversion tables the manometer reading can be changed to represent equivalent units of pounds per square inch, pressure in ounces, millimeters, miles per hour, knots, or thousands of feet altitude. If a flexible scale system were incorporated on a single manometer, direct reading scales could then be used to give the manometer reading directly in the units which would be most useful in aircraft instrument testing. Direct reading scales would also eliminate possible conversion errors, and above all, increase the speed of testing.

Meriam Instrument has designed a special well type manometer having a flexible scale arrangement whereby one manometer may be used to test all aircraft instruments operating on the pressure or vacuum principle. This instrument is known as the Model 30PA10. The instrument has a range of 61", and consists of a scale selector unit, indicating tube, manometer well, scale elevating mechanism, protective case with transparent cover, and mounting stand.



Model 30PA10TM

CONSTRUCTION

The channel is of heavy gauge steel, enclosing the scale drum and glass tube on three sides. The instrument end blocks are fastened to the channel by welding, forming one complete rigid member. The transparent cover is recessed in the channel opening, and is held in position by a cover frame fastened to the channel.

The indicating tube is of pyrex glass, 7/16" OD x 0.250" ID, gland packed in each end block. The glass tube is of large bore, giving a sharp and easily read meniscus when water or mercury is used as the indicating fluid. The tube is fastened to the channel at two points between the end blocks to keep it straight and parallel to the scale drum at all times. The general design of the Model 30PA10 manometer permits the convenient replacement of the glass tube in case of breakage.

The scale mechanism consists of a drum having a cross section of an eight-sided polygon, pivoted at each end block. Indexing of the drum is accomplished by a knurled knob at the base of the manometer. The entire scale mechanism is adjusted vertically for 2" of travel by a second knurled knob below the scale indexing knob.

A single scale is fastened to each side of the scale drum. A scale can be added or changed quickly, giving flexibility to the instrument should new scales be required for future test work. Standard scales are

available as listed in this bulletin. The metal scales have a light background with graduations and figures in black.

All scales using mercury as the indicating fluid are corrected to 0° C. for an observed temperature of 22°C. All scales using water as the indicating fluid are corrected to 4°C. for an observed temperature of 22°C.

For special applications, hand drawn scales can be furnished at additional charge. All scales are compensated for the fall of liquid level in the manometer well.

The manometer well is rectangular, fabricated of welded construction to provide smooth inner wall surfaces to prevent possible hanging of the indicating fluid. Two 1/4" NPT connections are provided on the top side of the well, and a 1/4" NPT connection out of the bottom for drain. The table mounting stand fastens directly to the bottom of the well.

A Meriam Model 942K50 check valve is provided in the upper end block to prevent loss of indicating fluid should a sudden surge of pressure exceed the range of the manometer. The fluid is returned to the manometer well through the indicating tube after the pressure surge has subsided.

The Model 30PG10TM is the same as the 30PA10 except the 1/4" low pressure connection for the manometer is made directly from the check valve to the lower left side of the manometer channel.

SPECIFICATIONS:

Model: 30PA10 TM

Type: Well

Range: 61"

Pressure Rating: 100 PSIG

Mounting: Table

Indicating Tube: .250" I.D. Borosilicate

Body Construction: Steel Channel

Wetted Parts Material: 303 Stainless Steel

Scale Finish: White, non-glare,
with black graduations

Finish: Baked Black Crackle

Accessories:

Pressure-vacuum Variator Model 971A3 & 971B3

Special Features: Multiple scale selection

Weight & Indicating Fluid Required:

Shipping Weight: 110 pounds

Mercury: 5 pounds

Water: 6 fluid ounces

SCALES FOR AIRCRAFT INSTRUMENT CALIBRATION

Using Mercury corrected to 0°C for

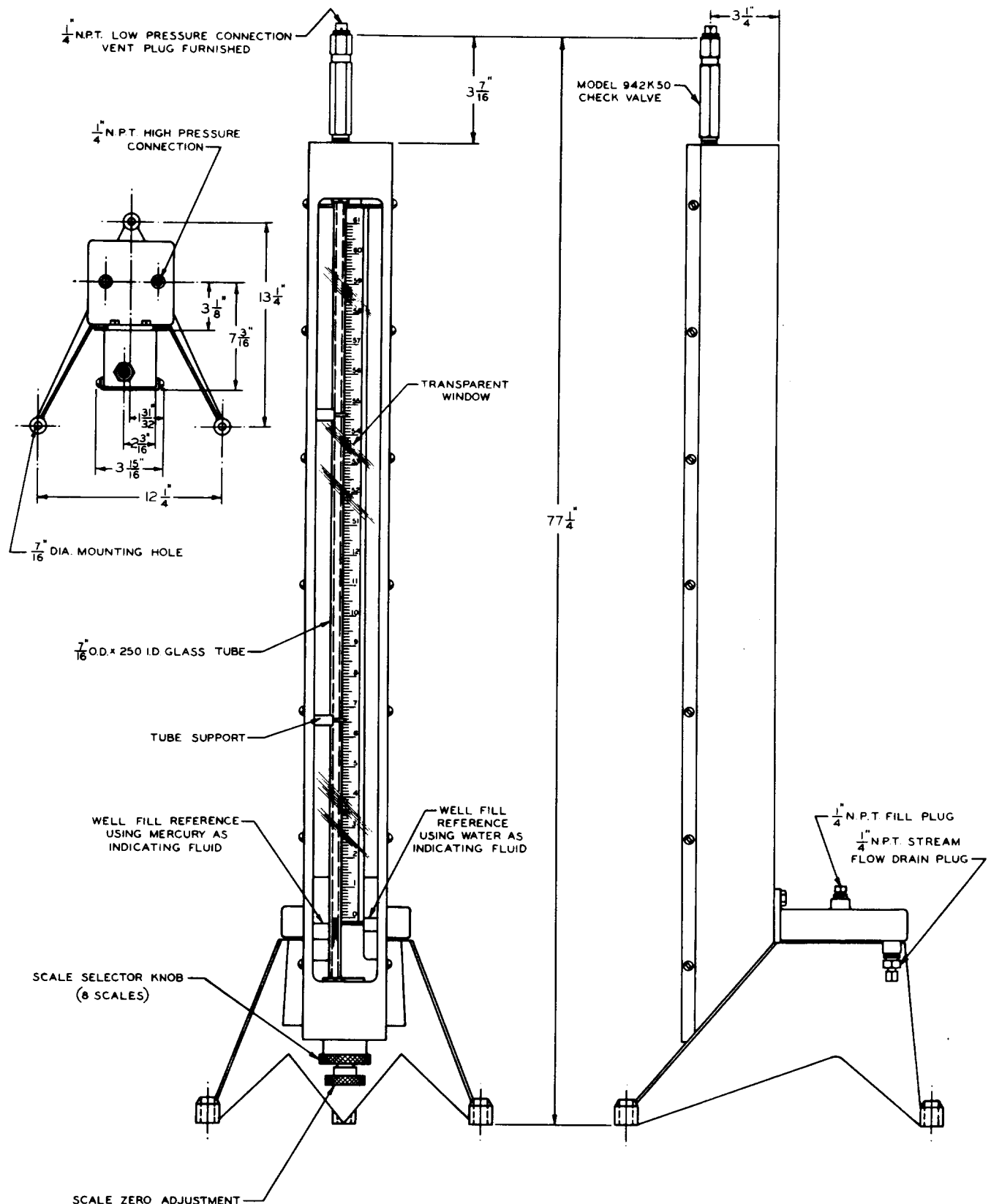
Observed Temperature at 22°C

| | |
|----------|--|
| SC-1300M | Pounds and tenths, range 0-30 lbs. |
| SC-1301M | Inches and tenths, range 0-61" |
| SC-1302M | Inches and tenths absolute, range 31"-0 |
| SC-1303M | Inches and tenths absolute, range 28"-89" |
| SC-1304M | Centimeters and millimeters absolute, range 80 cms-0 |
| SC-1890M | Centimeters and millimeters, range 0-156 cms. |
| SC-1305M | Miles per hour airspeed, range 250-1060 MPH |
| SC-1306M | Knots airspeed, range 200-920 knots |
| SC-1499M | Minus 1000 feet to zero to 200,000 feet altitude adjustable barometric range 787 to 735 mms. |
| SC-1500M | Plus 1000 feet to 200,000 feet altitude adjustable barometric range 734 to 683 mms. |
| SC-1501M | Plus 3000 feet to 200,000 feet altitude adjustable barometric range 682 to 634 mms. |
| SC-5144 | Kg per sq. cm. using mercury |
| SC-6736 | Millibars using mercury |

Using Water corrected to 4°C for

Observed Temperature of 22°C

| | |
|----------|---|
| SC-1301W | Inches and tenths, range 0-61" |
| SC-1315W | Miles per hour airspeed, range 0-344 MPH |
| SC-1316W | Knots airspeed, range 0 to 295 knots |
| SC-1317W | Pounds and hundredths, range 0 to 2.2 lbs. |
| SC-1890W | Centimeters and millimeters, range 0 to 156 cms. |



FINISH: BAKED BLACK CRACKLE
WELDED CONSTRUCTION

MODEL 30PA10T'M
MERIAM WELL TYPE MANOMETER
TABLE MOUNTING

TO ORDER, SPECIFY:

1. Quantity
2. Model 30PA10 TM
3. Range 61"
4. Scale Graduations
5. Indicating Fluid: Mercury or water
6. Accessories
7. Spare Parts

APPLICATION AND OPERATION FOR CALIBRATING AIRCRAFT INSTRUMENTS

In using the Meriam Model 30PA10 manometer as a primary pressure standard, the instrument to be tested is connected in parallel with the manometer. A source of pressure or vacuum is connected to the two units and allowed to equalize. By suitable valving the system can be vented to give any desirable pressure value within the scale range of the instrument to be tested.

When checking gauges reading directly in absolute units of pressure, it is first necessary that the manometer scale be adjusted for the barometric pressure at time of test. With both sides of the manometer vented to atmosphere, operate the scale elevating knob, setting the absolute scale with the graduation representing the barometric pressure at the mercury level. For absolute readings above barometer, connect the pressure source directly to the instrument well. For readings below barometer, connect the vacuum source to the manometer low pressure connection. The correct scale must be indexed behind the indicating tube, depending on whether the absolute pressure to be measured is above or below atmospheric pressure.

Each altitude scale is provided with a barometric scale reading directly in millimeters. This barometric scale is used in setting the main scale, and is available in several ranges, depending on the average

barometric pressure range at the point where the manometer is to be used. In each case the altitude scale is adjusted for the barometric pressure at time of test. This adjustment is made by setting the barometric pressure at the mercury level in the indicating tube. As all altitude scales are graduated in thousands of feet from a base of zero elevation at 29.92" of mercury absolute, in setting the altitude scale for a barometric pressure other than sea level the altitude scale will then read the true equivalent altitude with full correction and compensation for the barometric pressure at time of test.

For general test requirements, it is recommended that the mercury manometer be furnished with the following scales: SC-1300M, SC-1301M, SC-1302M, SC-1303M, SC-1305M, SC-1306M, SC-1890M, and one altitude scale, SC-1499M, SC-1500M, or SC-1501M, depending on the average barometric pressure variation at elevation where manometer is to be operated. If scale SC-1306M is not required, an additional altitude scale can be specified. **For correct absolute pressure and altitude scale specification, the elevation above sea level should be specified when ordered.**

For the water manometer, it is recommended that the unit be furnished with the following scales: SC-1301W, SC-1315W, SC-1316W, and SC-1317W.



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